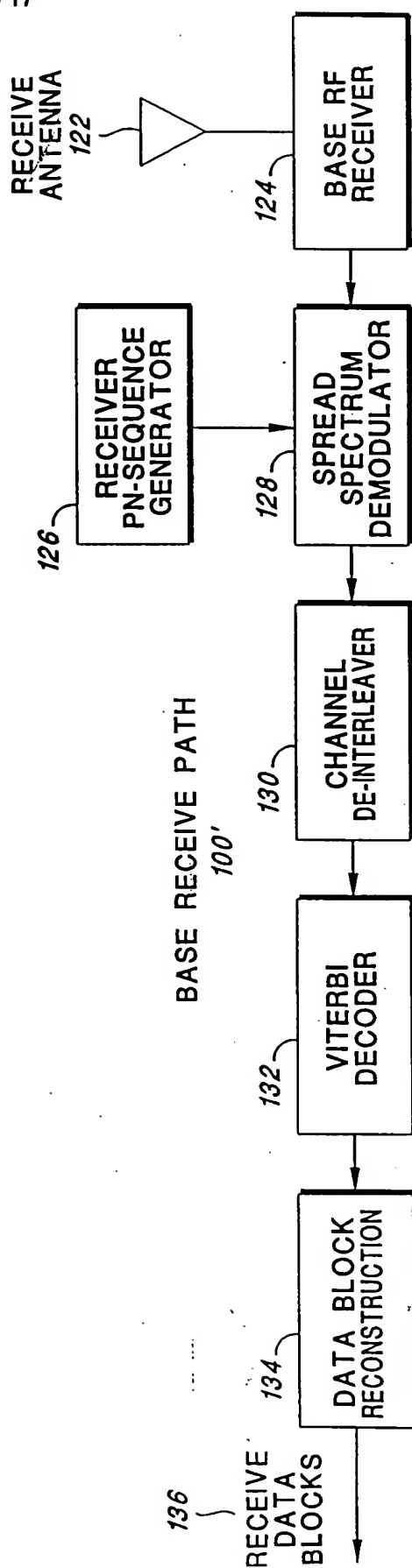
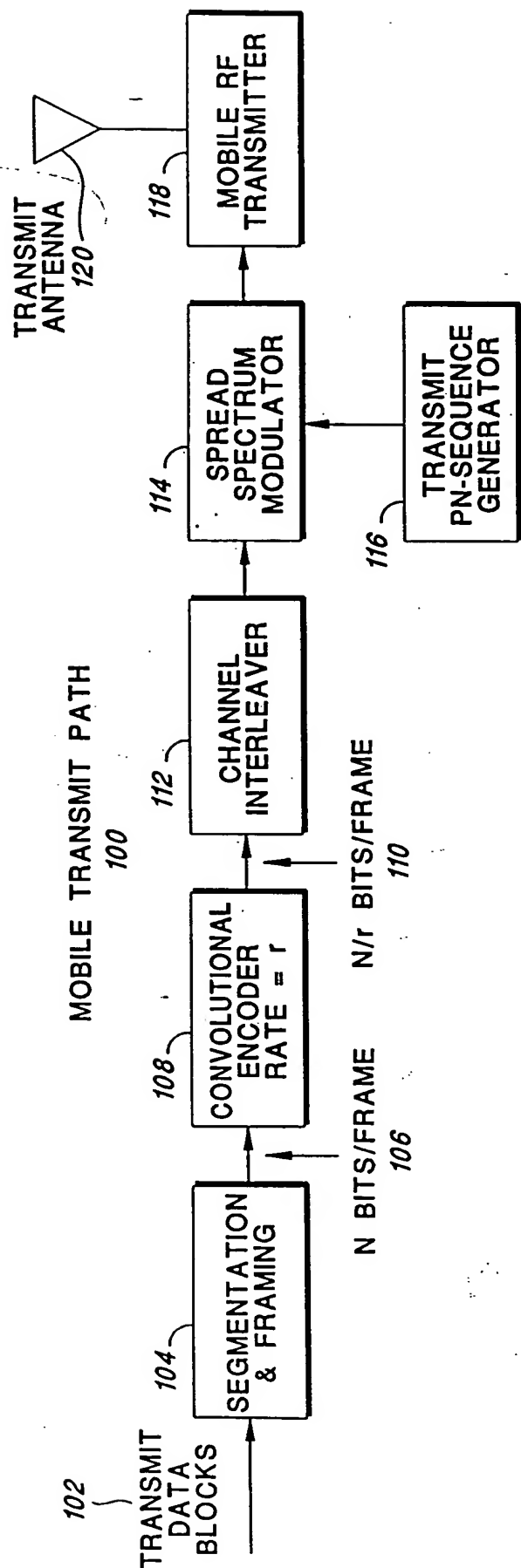


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BLOCK DIAGRAM OF A DIRECT SEQUENCE CDMA DIGITAL CELLULAR MOBILE TRANSMITTER AND BASE RECEIVER

FIG. 1

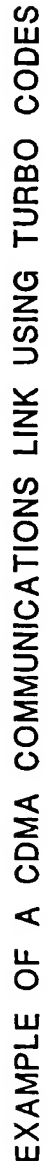
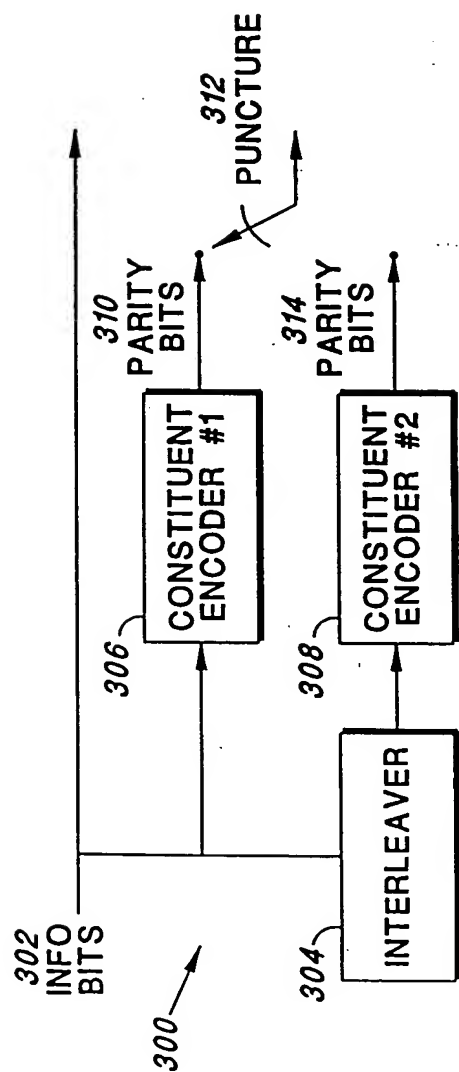
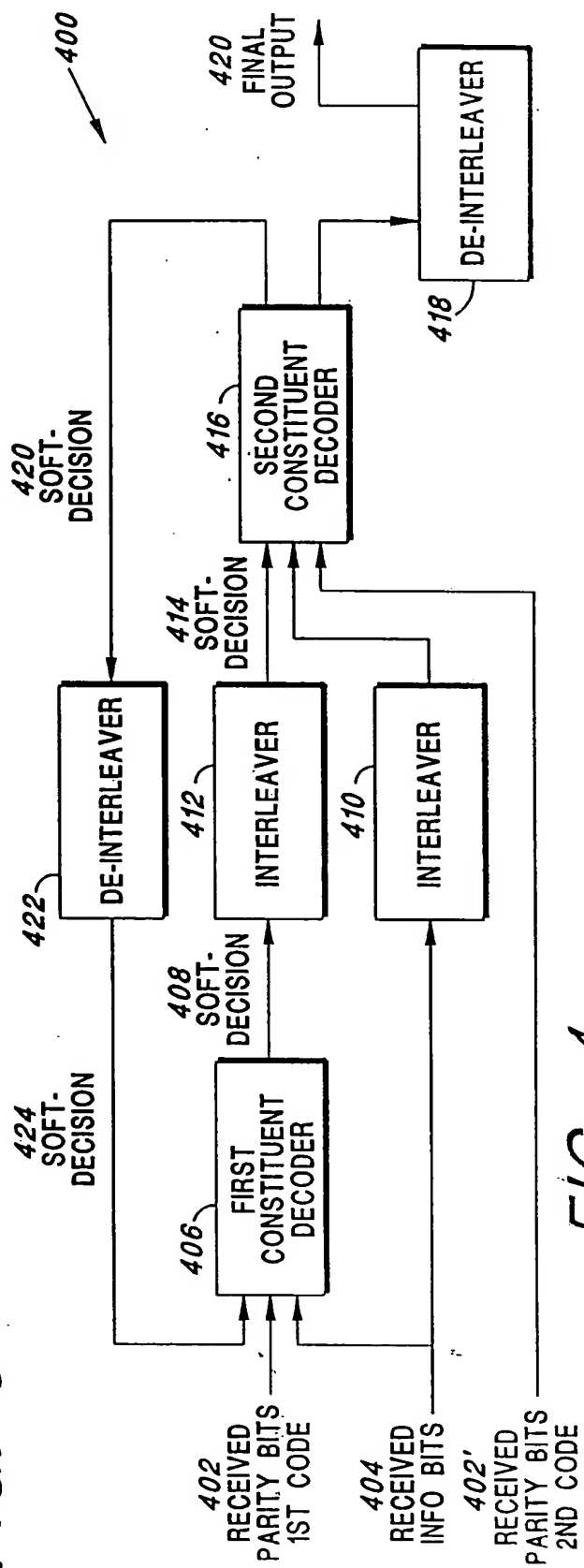


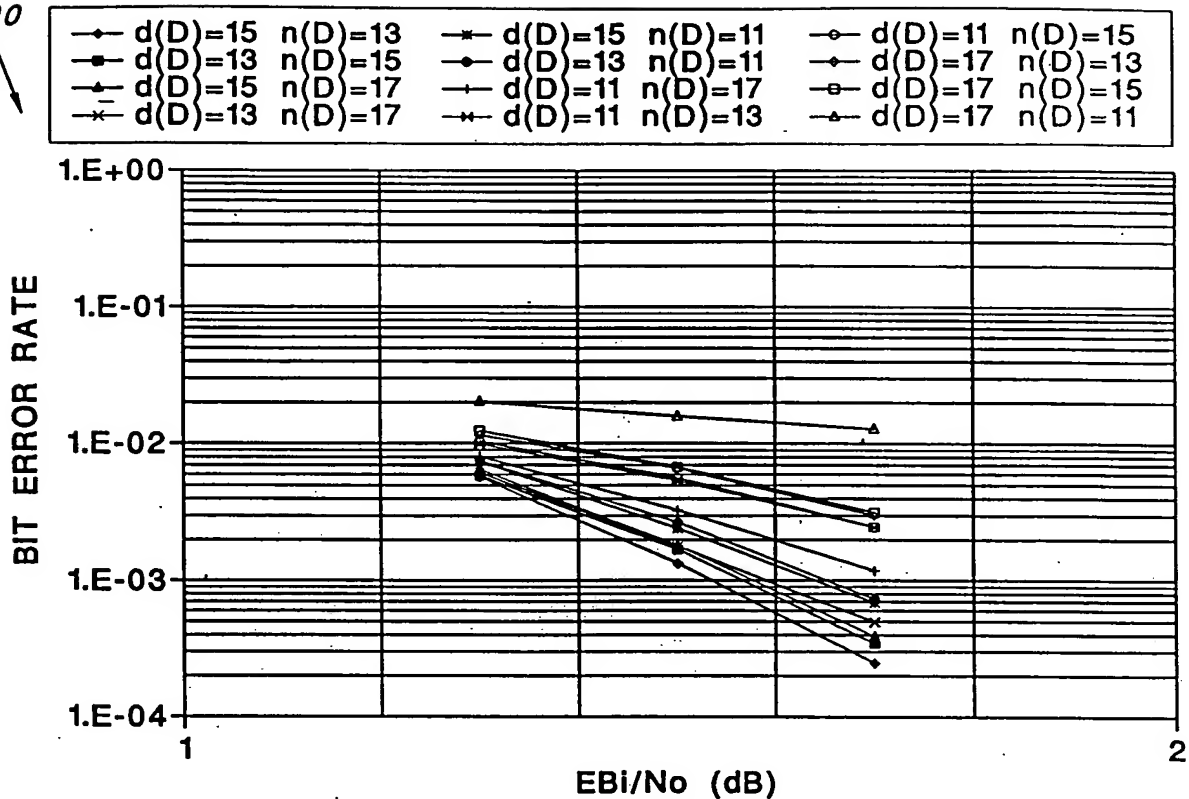
FIG. 2



# GENERIC TURBO CODE ENCODER BLOCK DIAGRAM

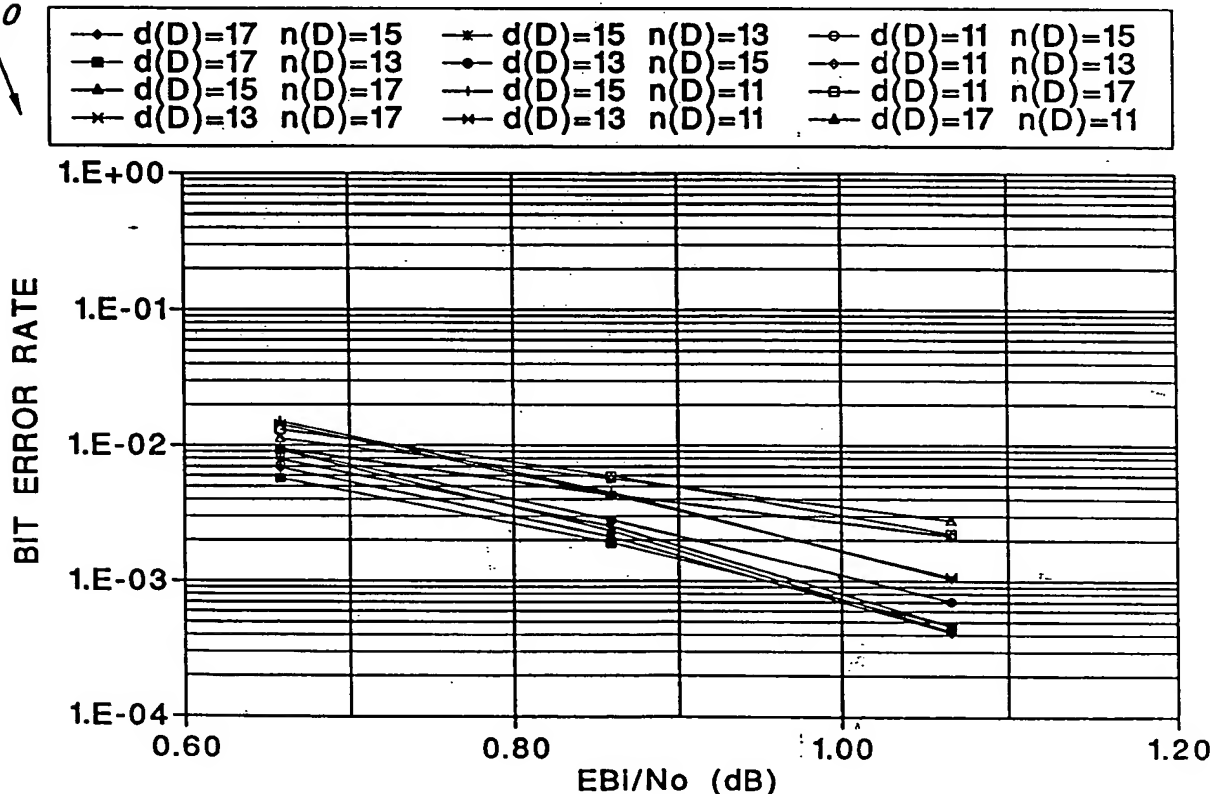


500



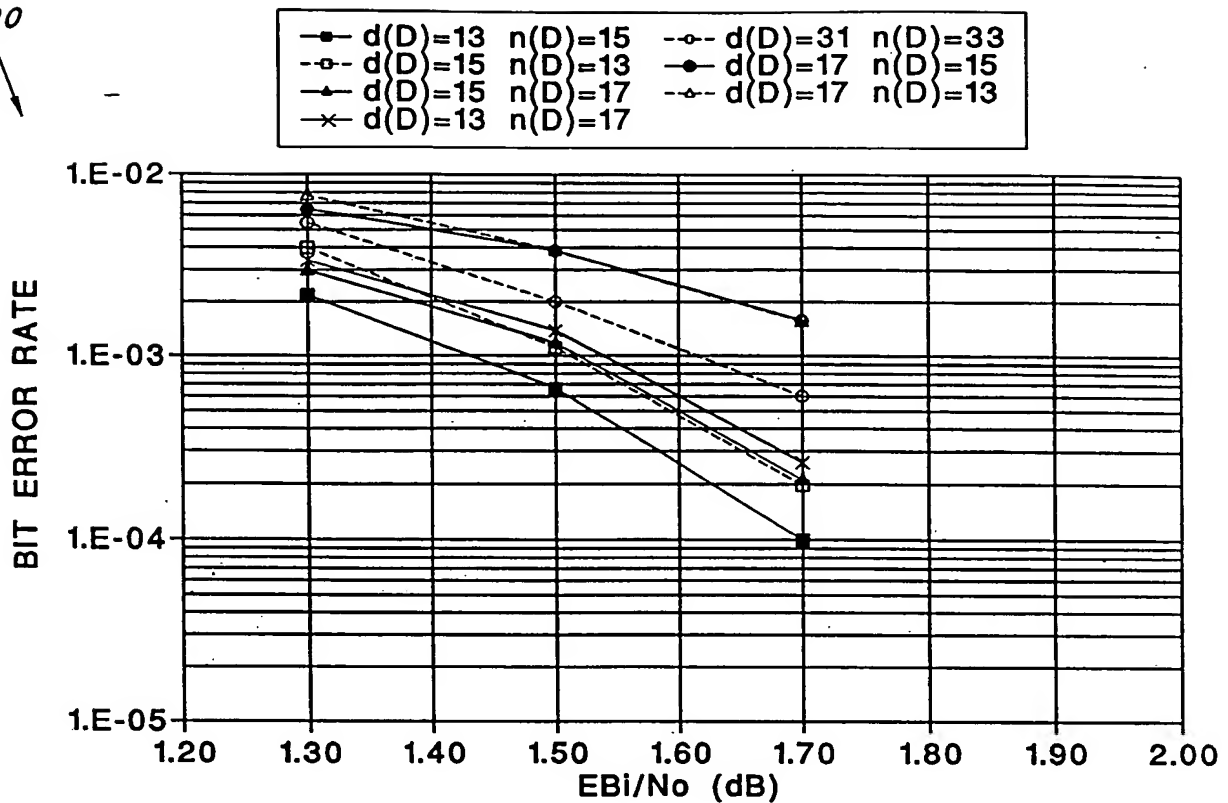
**FIG. 5** RATE-1/2 TURBO CODES ON AWGN CHANNEL. (1000 BIT INTERLEAVER, 3 ITERATIONS)

600



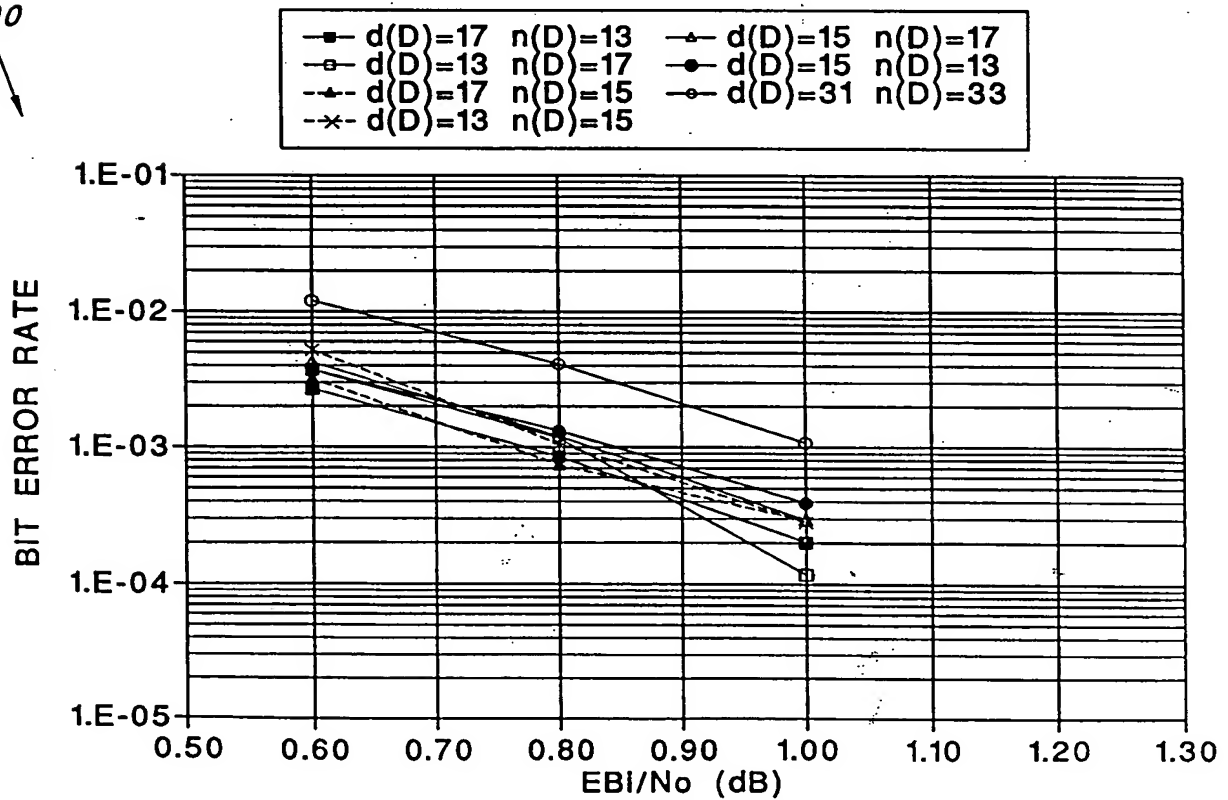
**FIG. 6** RATE-1/3 TURBO CODES ON AWGN CHANNEL. (1000 BIT INTERLEAVER, 3 ITERATIONS)

700

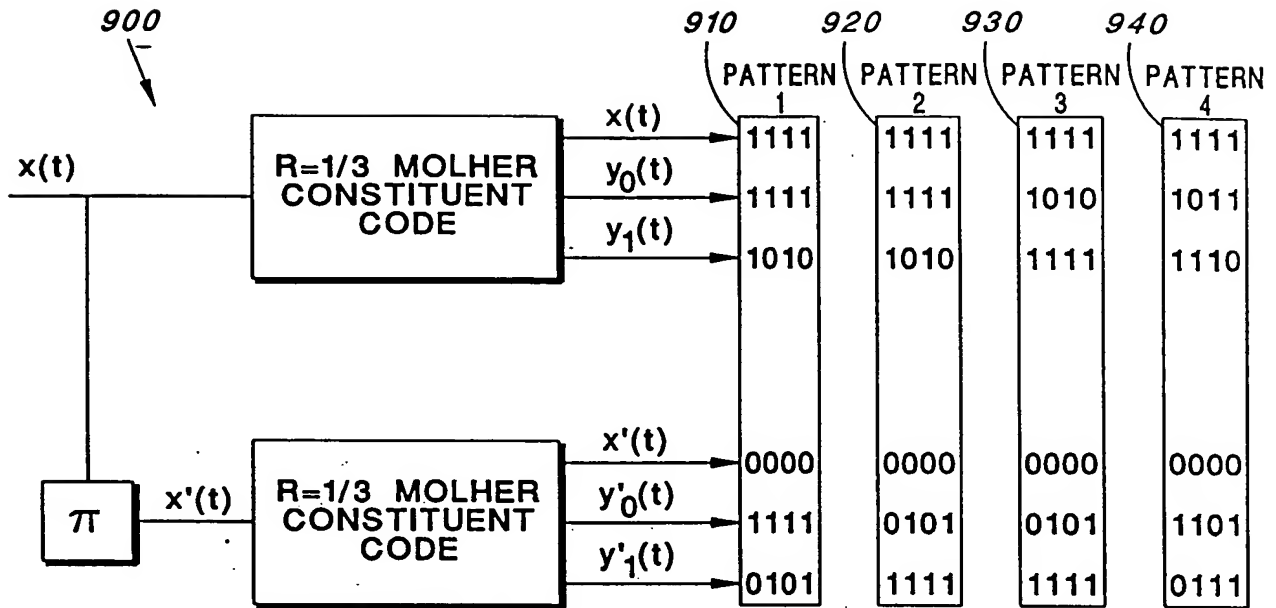


**FIG. 7** SELECTED RATE 1/2 TURBO CODES ON AWGN CHANNEL, 512 BIT FRAME SIZE

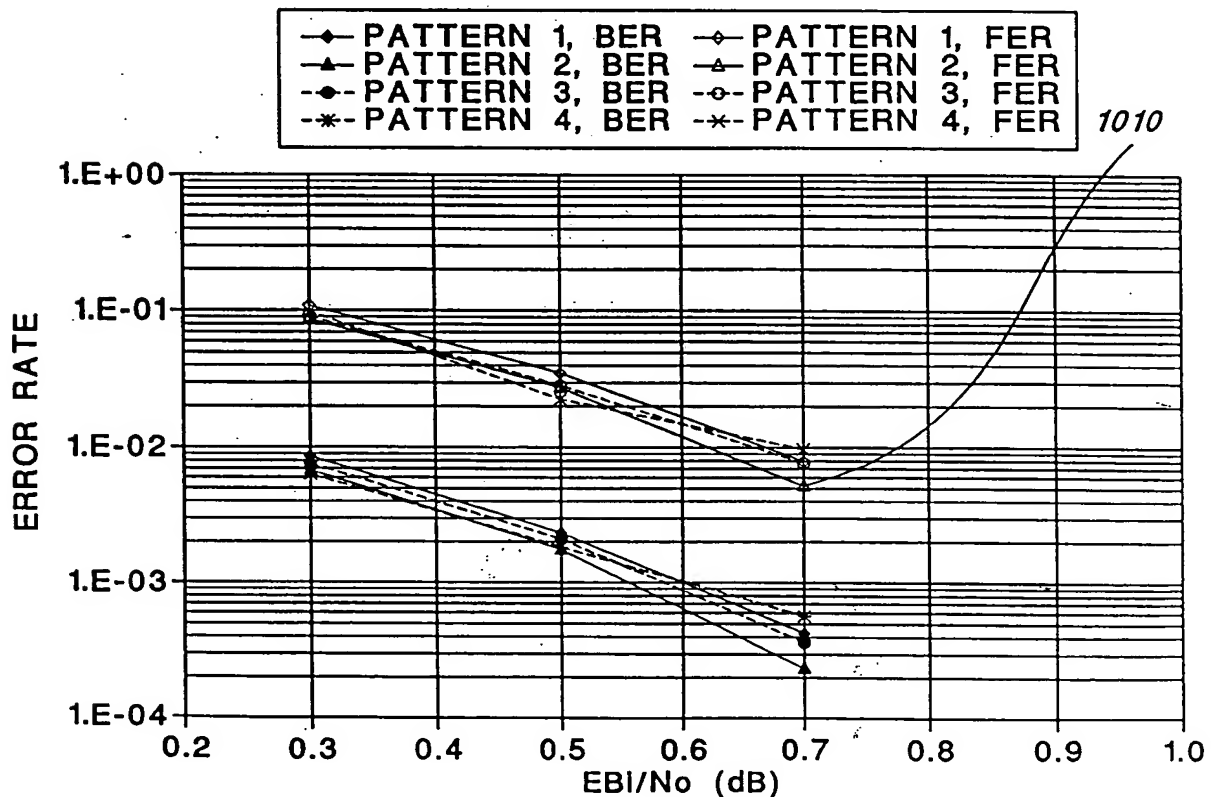
800



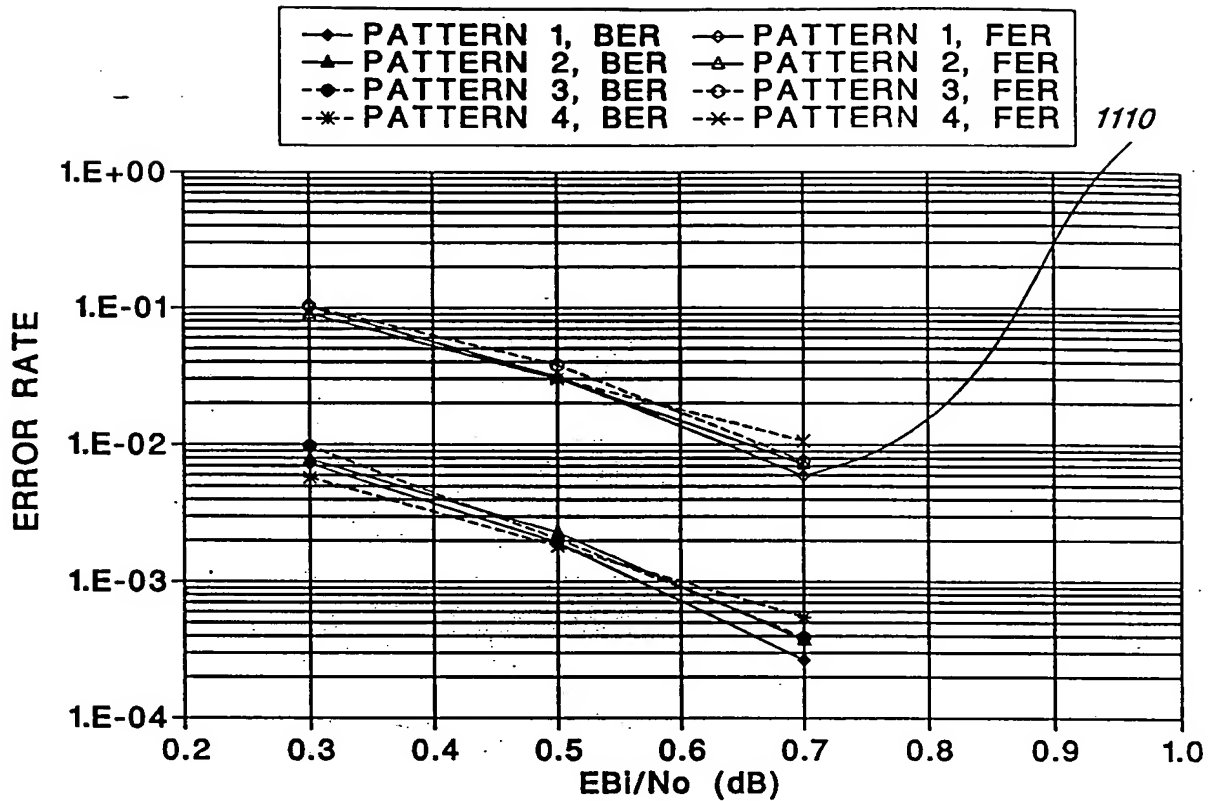
**FIG. 8** SELECTED RATE 1/3 TURBO CODES ON AWGN CHANNEL, 512 BIT FRAME SIZE



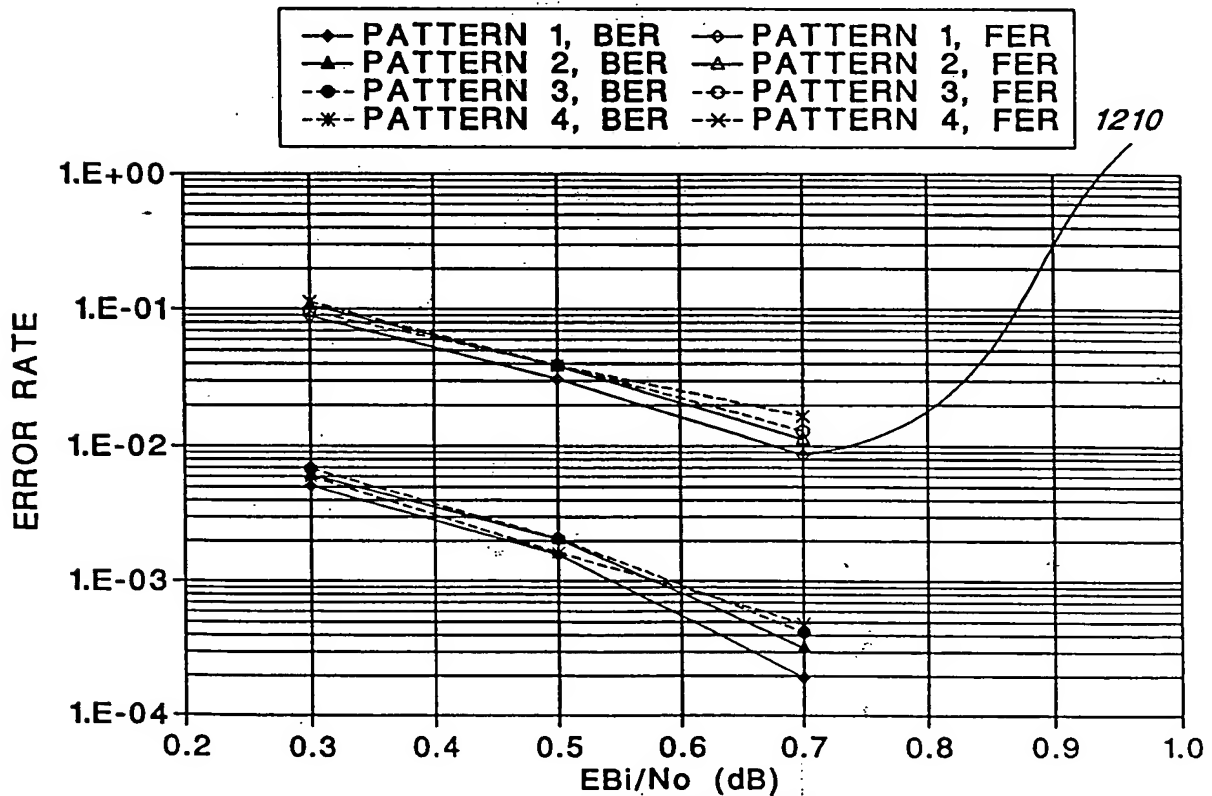
**FIG. 9** PUNCTURING SCHEMES STUDIED FOR OPTIMIZING THE RATE 1/4 TURBO CODE



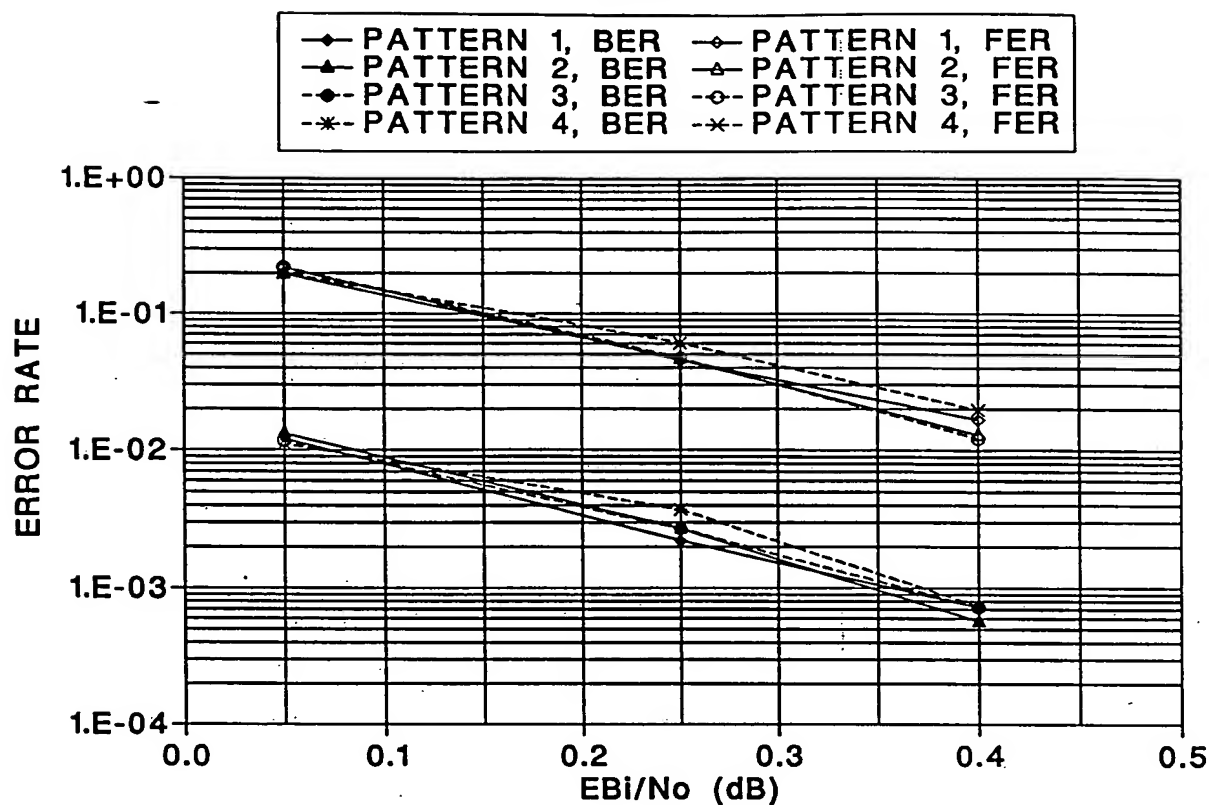
**FIG. 10** PERFORMANCE OF CODE #1, FRAME SIZE=512



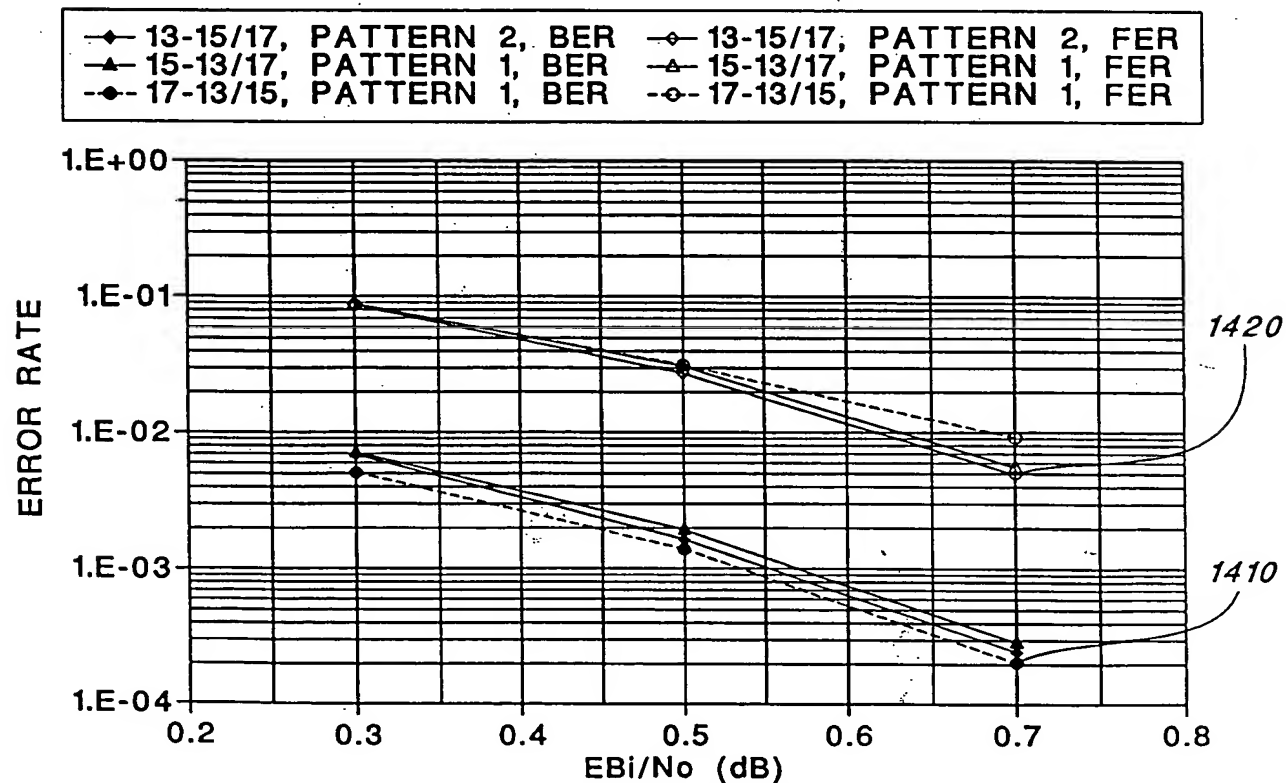
**FIG. 11** PERFORMANCE OF CODE #2,  
FRAME SIZE=512



**FIG. 12** PERFORMANCE OF CODE #3,  
FRAME SIZE=512

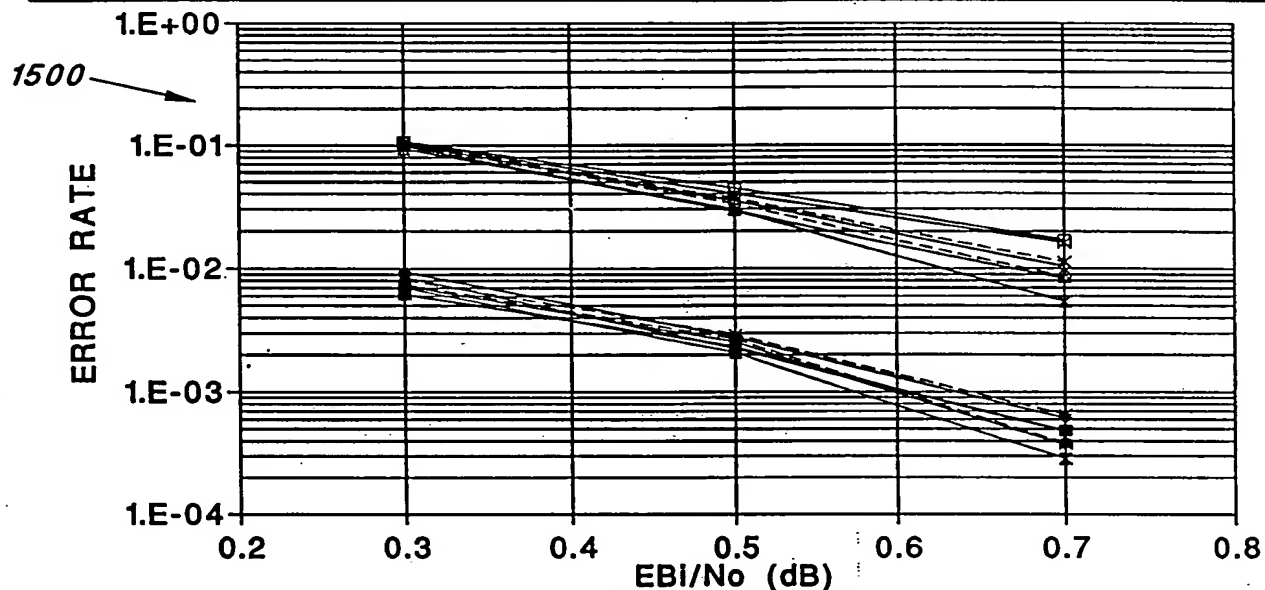
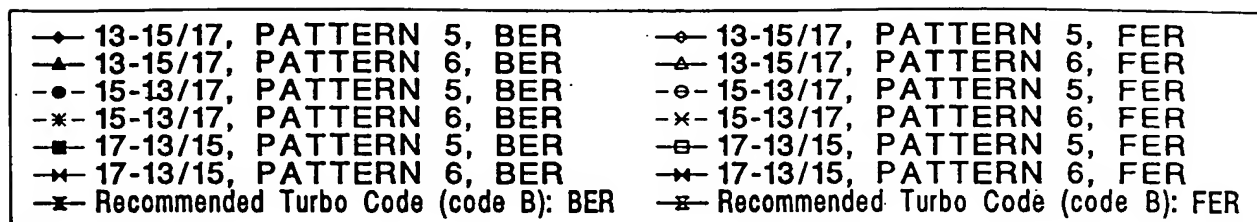


**FIG. 13** BER/FER PERFORMANCE OF CODE #1, FRAME SIZE=1024

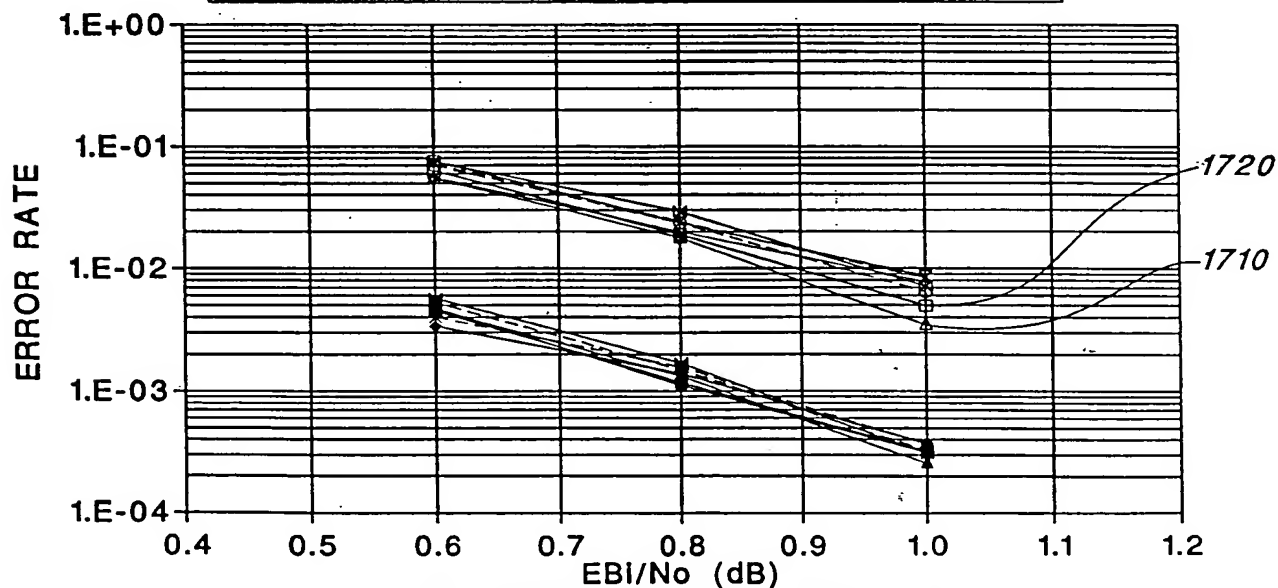
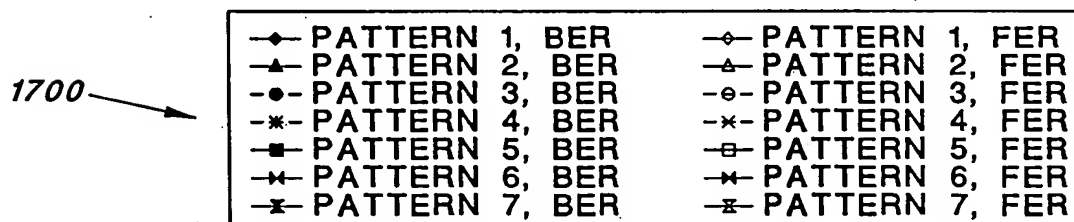


**FIG. 14** BER/FER PERFORMANCE OF SELECTED RATE-1/4 TURBO CODES, FRAME SIZE=512





**FIG. 15** COMPARISON AGAINST OTHER PUNCTURING SCHEMES, FRAME=512



**FIG. 17** COMPARISON OF RATE 1/3 PUNCTURING SCHEMES, FRAME=512

10/17

1600

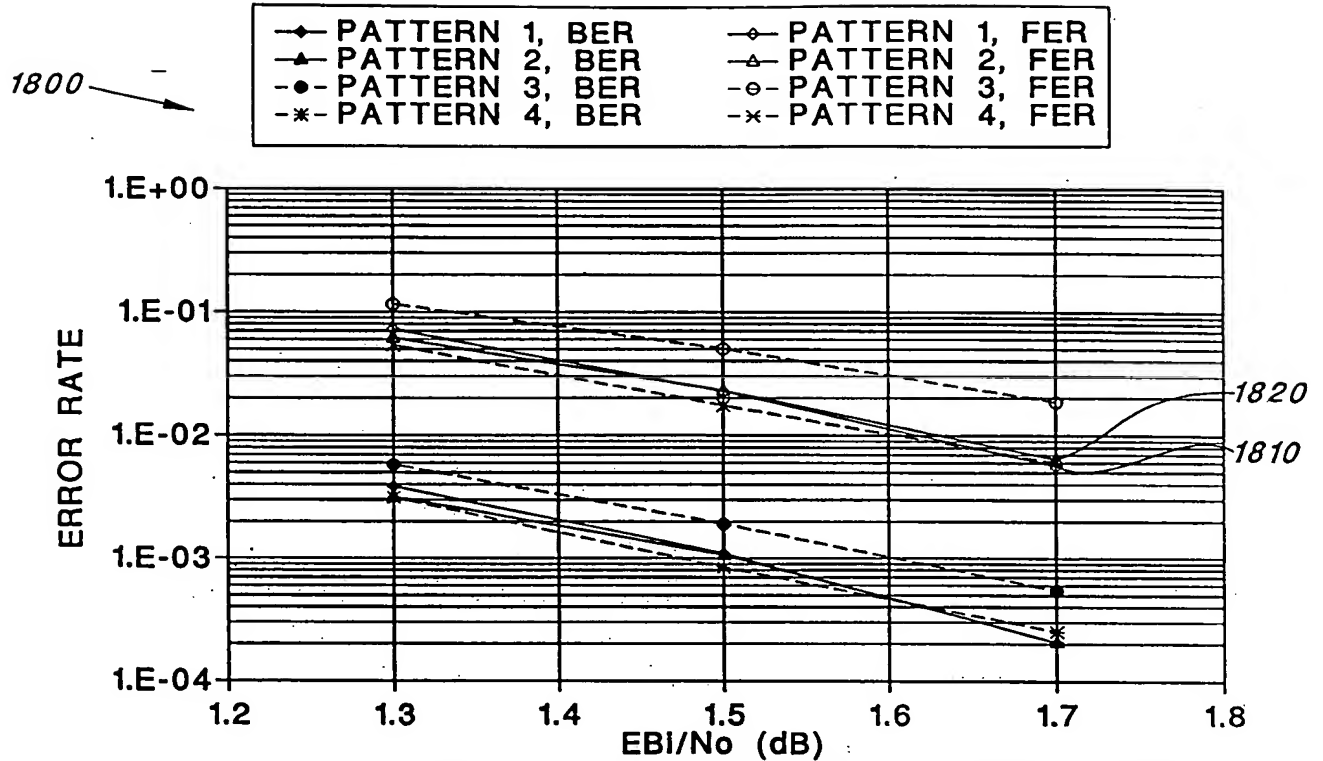
<u>1602</u>	<u>1604</u>	<u>1606</u>	<u>1608</u>	<u>1610</u>	<u>1612</u>	<u>1614</u>
PATTERN 1	PATTERN 2	PATTERN 3	PATTERN 4	PATTERN 5	PATTERN 6	PATTERN 7
1111	1111	1111	1111	1111	1111	1111
1111	0000	1010	1110	1111	1110	0001
0000	1111	0101	0001	0000	0001	1110
0000	0000	0000	0000	0000	0000	0000
1111	0000	1010	0001	0000	1110	0001
0000	1111	0101	1111	1111	0001	1110
						1616
						1620
						1622
						1624
						1626
						1628
						1630

(a) TURBO CODE RATE = 1/3

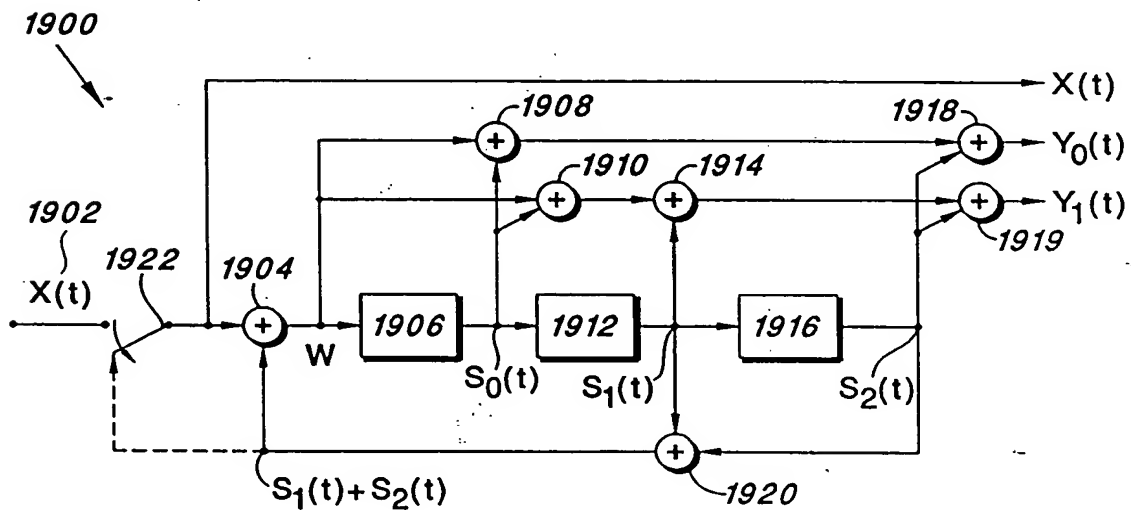
<u>1640</u>	<u>1642</u>	<u>1644</u>	<u>1646</u>
PATTERN 1	PATTERN 2	PATTERN 3	PATTERN 4
1111	1111	1111	1111
1010	0000	1000	1010
0000	1010	0010	0000
0000	0000	0000	0000
0101	0000	0001	0000
0000	0101	0100	0101

(b) TURBO CODE RATE = 1/2

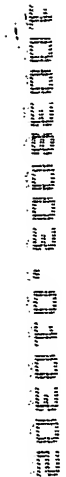
FIG. 16 ESSENTIAL PUNCTURING PATTERNS FOR RATE 1/3 CONSTITUENT CODES



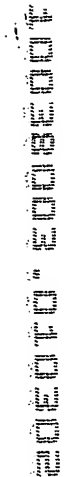
**FIG. 18** RATE 1/2 PUNCTURING COMPARISON, FRAME=512



**FIG. 19** UNIVERSAL CONSTITUENT ENCODER  
RECOMMENDED FOR FORWARD LINK TURBO  
CODES OF VARYING INTERLEAVER DEPTH



**SECRET**



**SECRET**

PATTERN 1	PATTERN 2
111	111111
111	111110
000	000000
000	000000
110	110111
000	000000

PUNCTURING PATTERNS  
FOR RATE 3/8 FORWARD  
LINK CODES

*FIG. 21*

PATTERN 1	PATTERN 2
1111	11111111
1101	11011010
0000	00000000
0000	00000000
1010	10101101
0000	00000000

PUNCTURING PATTERNS  
FOR RATE 4/9 FORWARD  
LINK CODES

*FIG. 23*

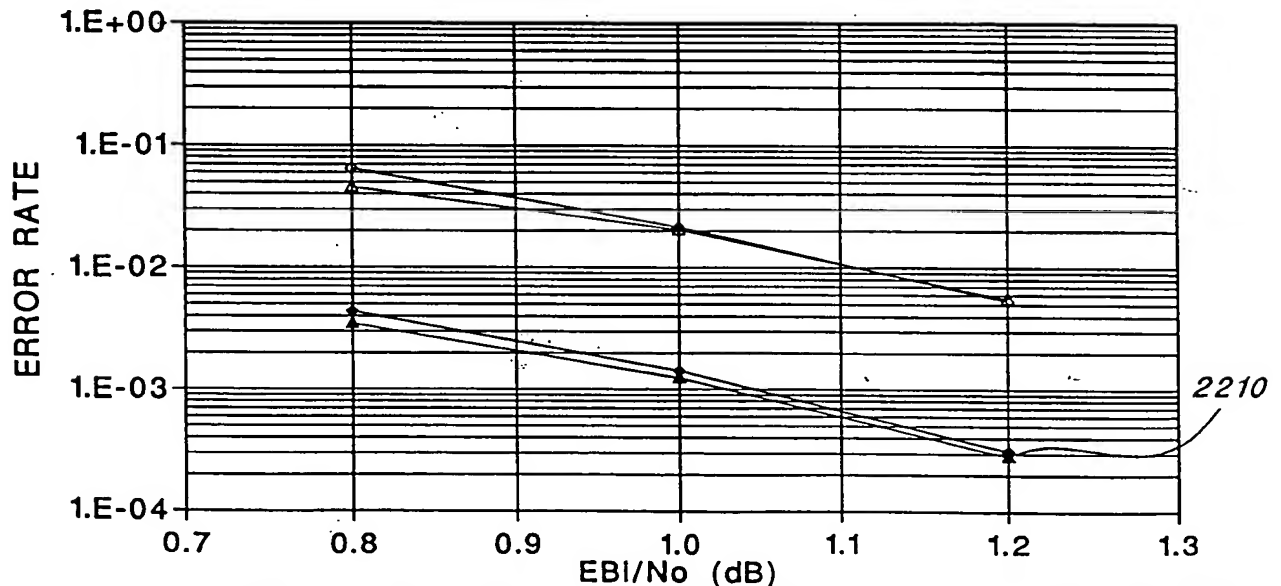
PATTERN 1	PATTERN 2	PATTERN 3
1111	1111	1111
1111	1011	1111
1011	1111	1011
0000	0000	0000
1111	1110	1110
1110	1111	1111

PUNCTURING PATTERNS FOR RATE 2/9 REVERSE LINK CODES

*FIG. 27*

2200

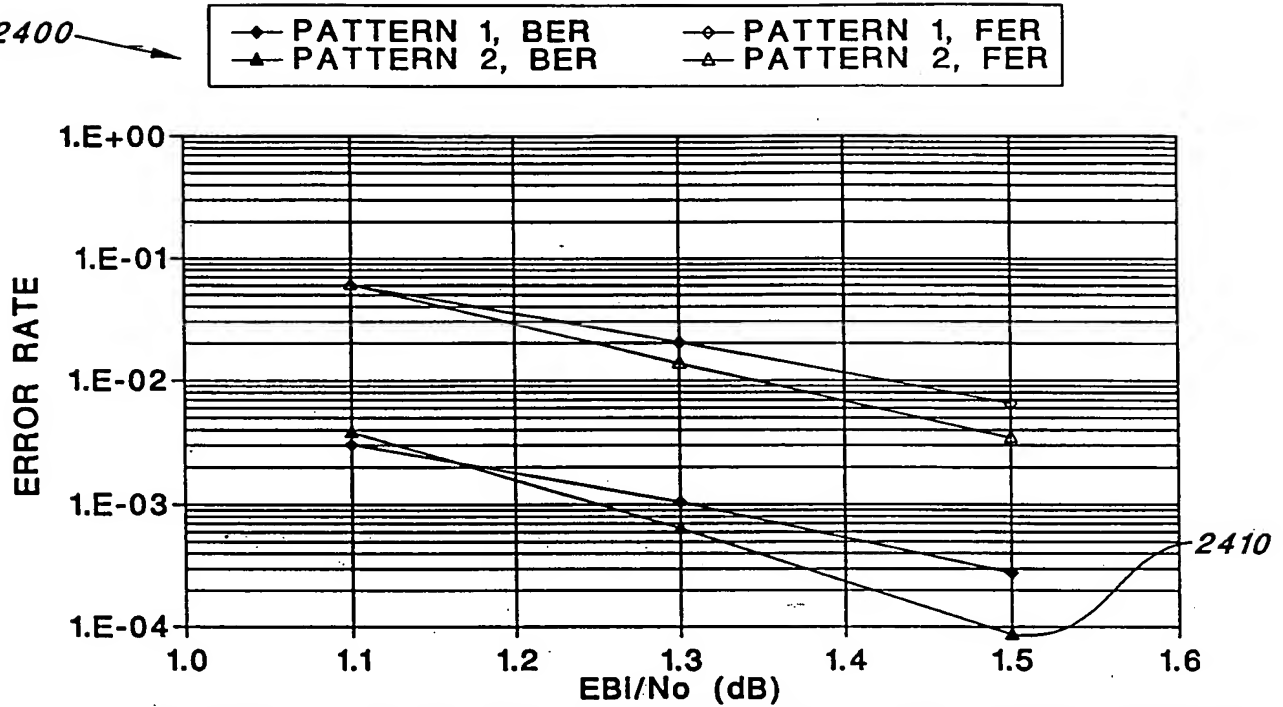
◆ PATTERN 1, BER	◇ PATTERN 1, FER
▲ PATTERN 2, BER	△ PATTERN 2, FER



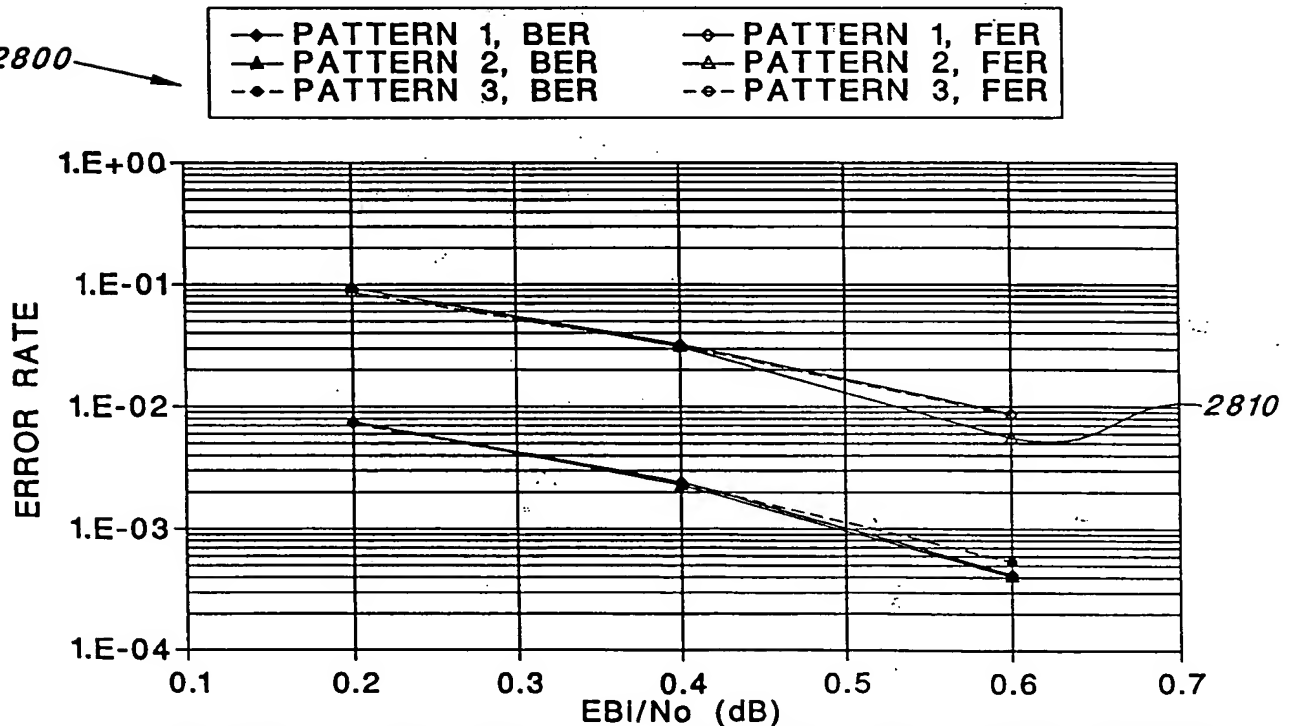
*FIG. 22* RATE 3/8 FORWARD LINK TURBO CODES,  
FRAME=512, AWGN CHANNEL

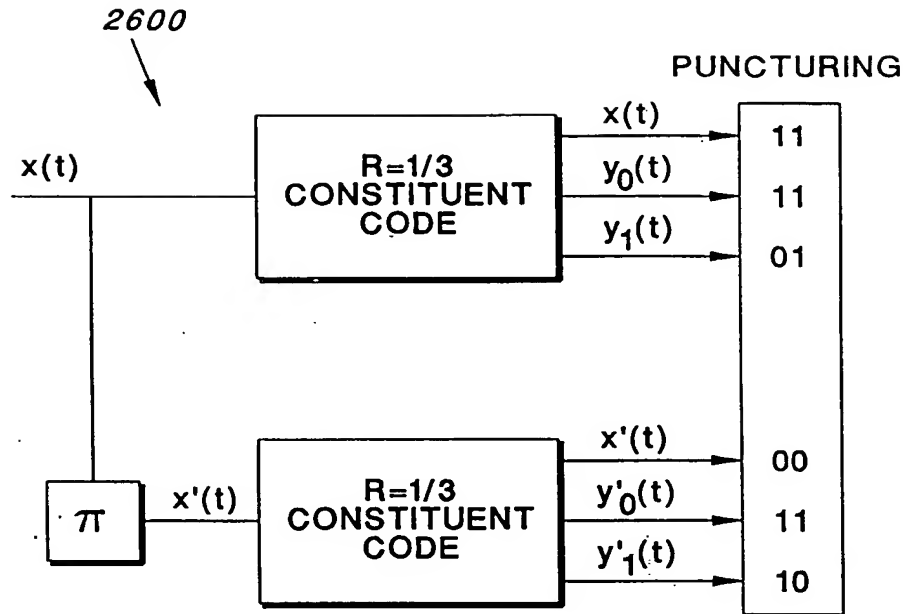
202010-200800T

2400

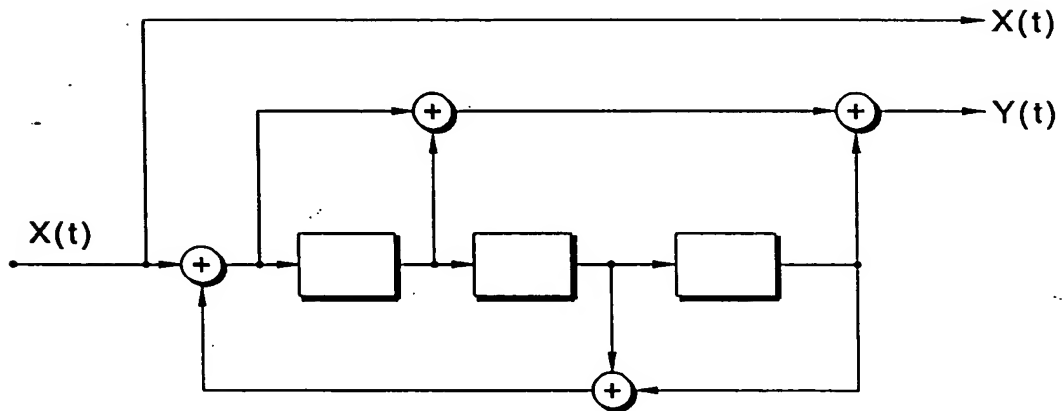


2800





**FIG. 26** REVERSE LINK TURBO CODE OF RATE 1/4  
(MOTHER CODE IN FIGURE 25)



**FIG. 31** UNIVERSAL CONSTITUENT ENCODER  
RECOMMENDED FOR  $R=1/2$  AND  $R=1/3$  TURBO  
CODES OF VARYING INTERLEAVER DEPTH

20E0T0" E008E00T

16/17					
PATTERN 1		PATTERN 2		PATTERN 3	
111		111		111	
111		110		110	
000		001		001	
000		000		000	
110		110		010	
000		000		100	
PATTERN 4		PATTERN 5		PATTERN 6	
111		111		111	
100		100		000	
011		011		111	
000		000		000	
010		000		000	
100		110		110	

INITIAL PUNCTURING PATTERNS  
FOR RATE 3/8 REVERSE LINK CODES

FIG. 29

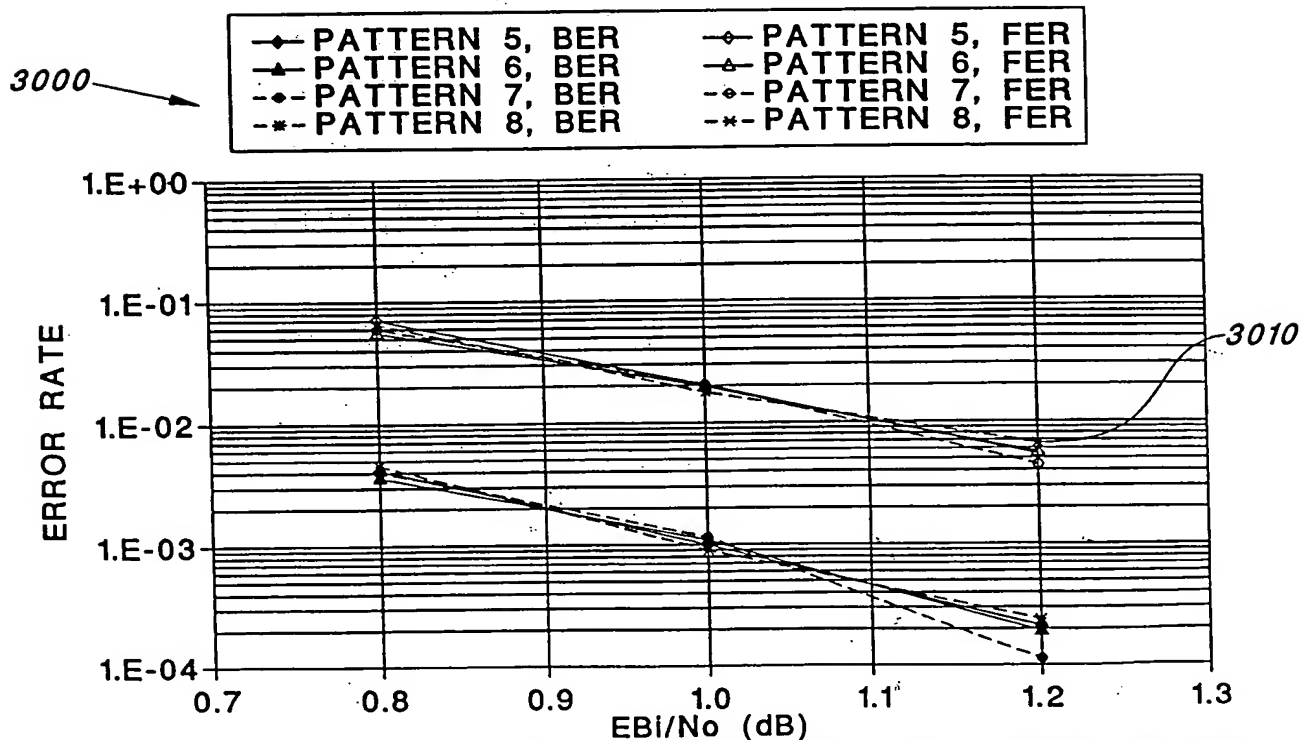


FIG. 30 RATE 3/8 REVERSE LINK TURBO CODES,  
FRAME=512, AWGN CHANNEL



3200

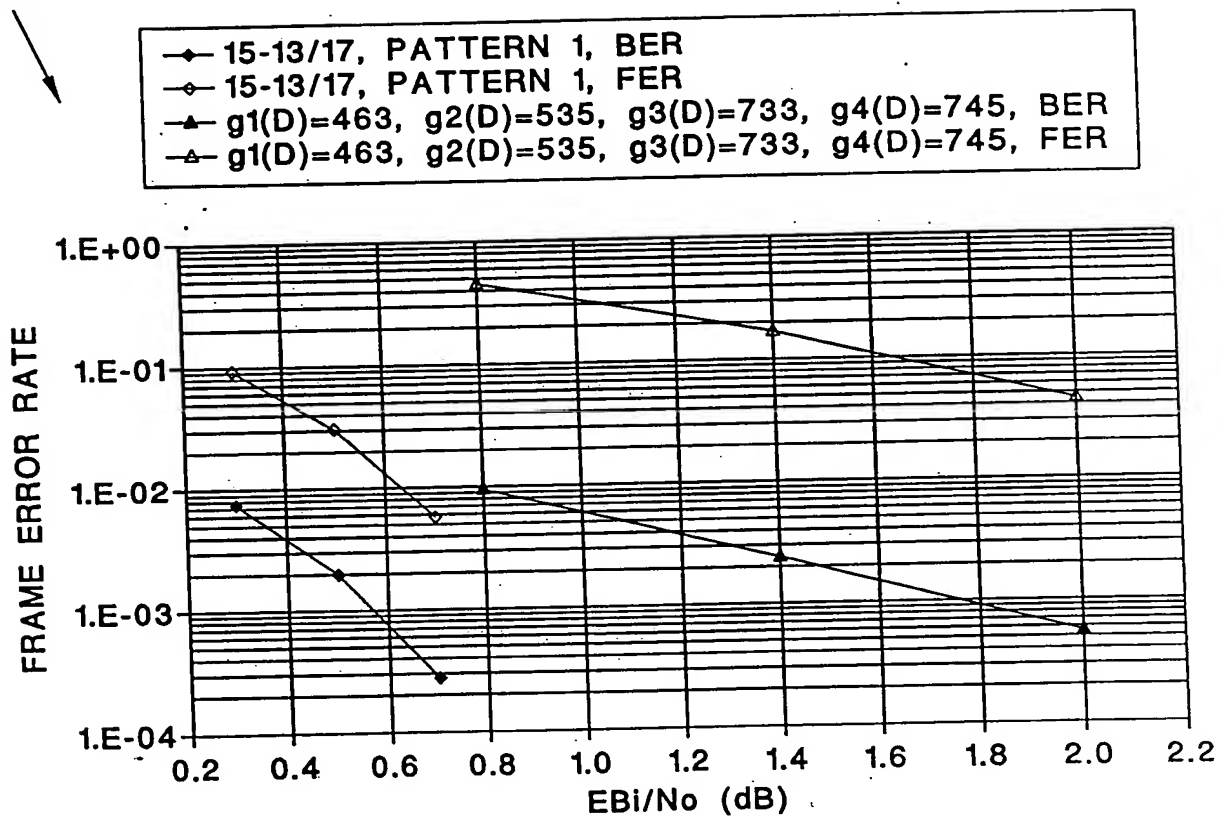


FIG. 32

COMPARISON OF RATE 1/4 FER-OPTIMIZED  
TURBO CODE VS CONVOLUTIONAL CODE,  
FRAME SIZE=512